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Rev. 07/10/02

**WASTE MANAGEMENT**

Closed Sites Management Group
W124 N9355 Boundary Road
Menomonee Falls, Wisconsin 53051
(414) 253-8626
(414) 255-3798 Fax

August 2, 2000

Mr. Ron Murawski
Remedial Project Manager
H.O.D. Landfill Site
U.S. EPA, Region 5 (SR-6J)
77 West Jackson Boulevard
Chicago, IL 60604

RE: Responses to USEPA Comments on the July 2000 Final Remedial Design Submittal
H.O.D. Landfill Site
Antioch, Illinois

Dear Mr. Murawski:

Attached for your review please find two copies of the responses to review comments on the construction-related components of the July 2000 Final (100%) Remedial Design (RD) submittal for the H.O.D. Landfill, located in Antioch, Illinois. These responses and associated document revisions were prepared by Waste Management of Illinois, Inc. (WMII), with assistance from RMT, Inc. of Madison, Wisconsin. The submittal includes responses to review comments and corresponding text revisions to the RD Report, Construction Quality Assurance Plan (CQAP), and the Health and Safety Plan (HSP).

The revisions to text have been based on comments contained in the July 19, 2000 conference call, your July 21, 2000 letter addressing review of the documents (which were included as part of the earlier July 2000 Final RD submittal), and the August 1, 2000 conference call. The comment responses summarize how each of your comments was addressed as part of the development of the revisions to the final design documents. Corresponding revisions to the text of the final design documents are submitted in strikeout/revision mode. Only pages where text revisions have been made are included in this submittal. As we discussed in the June 15, 2000 and August 1, 2000 conference calls, submittal of a complete set of the RD documents will occur with final USEPA approval of the RD.

WMII respectfully requests that USEPA expedite review of the submitted responses to comments and revisions to text of the design report, CQA Plan, and HSP such that implementation of Remedial Action (RA) construction can begin as soon as possible. It continues to be WMII's objective to initiate RA construction this August, especially the leachate and gas management system components of the RA. WMII understands that USEPA review of non construction-related documents (e.g., Field

Sampling and Analysis Plan, Operations and Maintenance Plan, Performance Standards Verification Plan, and Quality Assurance Project Plan) continues.

Copies of these responses and text revisions are being forwarded directly to the Illinois Environmental Protection Agency and Roy F. Weston (USEPA oversight contractor) for their review. If you have any questions or are in need of any additional information, feel free to contact me at (262) 253-8626, extension 123.

Sincerely,

Waste Management, Inc. - Closed Sites Management Group

Lawrence J. Buechel JMT

Lawrence J. Buechel, P.E.
Project Manager

Attachments

cc: Greg Ratliff, IEPA
Om Patel, Roy F. Weston (2 copies)
Mark Torresani, RMT

# Response to USEPA Region 5 Comments on the July 2000 Final (100%) Remedial Design Submittal (Construction Documents) - H.O.D. Landfill

Comments from the USEPA Region 5 and oversight regarding the July 2000 H.O.D. Landfill Final (100%) Remedial Design Deliverables (Construction Documents) are presented below, followed by the response where required. The documents have been modified as indicated in the response to comments.

## General Comments

***The ROD requires establishment of an inward gradient for the leachate collection system. Therefore, the inward gradient requirement for the leachate collection system becomes a performance standard. USEPA requested that WMII calculate the leachate drawdown timeframes in the review comments for intermediate design. No timeframes were provided in the intermediate design and prefinal design.***

***The timeframe calculations by RMT are provided in the Response to USEPA's Comments on the Prefinal Design and, as discussed with WMII and RMT, and noted in the specific comments below, the calculations for timeframes performed by RMT to achieve an inward gradient are not acceptable. The timeframes are not included in any final design deliverables. Since the inward gradient is the only performance standard for the leachate collection system, the predicted timeframes for achieving the inward gradient must be included in the Performance Standards Verification Plan (PSVP).***

***The PSVP should discuss in detail in the corrective action plan. The PSVP should also state a timeframe for corrective action to meet the inward gradient requirement. The PSVP must include an annual schedule for how much leachate is being removed to create an inward gradient within the approved timeframe.***

Response to General Comments: Based on leachate drawdown calculations provided to the USEPA on July 21, 2000, and subsequent conversation on the above comment with the USEPA on August 1, 2000, WMII will incorporate the following concepts into the PSVP (which is currently under review by the USEPA) as part of developing final documents:

- An estimated 12-year time frame to achieve drawdown objectives at the site.
- A system to monitor and track the performance of the leachate management system in the annual O&M reports, including volume of leachate hauled off site compared to predicted volumes and head reductions at leachate monitoring points.
- A means of calibrating the leachate drawdown estimates against monitoring data collected during the O&M period.

- Potential contingency remedial actions (e.g., well cleanout, replacement wells, incorporation of additional extraction wells, lowering of pumps) should leachate management system requirements listed in the ROD not be achieved in the time frame agreed to.

## Specific Comments

1. *Response to Comment 3, Page 2; and Comment 4, Page 3: A 9 to 13 year time frame for leachate drawdown is estimated based upon calculations included as Attachment 3.*

   *The method used to calculate drawdown is based on a false assumption (#4 in the list of assumptions); that is, that the transmissivity (T) of the waste and the available drawdown (h) are constant over time. If this assumption is accepted, then it infers that at the end of any given pumping period there will be 12 feet of head over the pump depth; therefore, drawdown to the 761 ft. msl elevation will never be achieved, by definition. This is, of course, not the case. When the 761 foot level is reached after 8 feet of drawdown, there will be 4 feet of available head over the pumps at 767 ft. msl, not 12 feet. As stated in the #3 background comment, "Pumping rates will decline as the leachate is lowered." Therefore, it is not useful to assume that there will be no drawdown in order to model the hydrology of the extraction system.*

   *In order to use this analysis in a meaningful way, transmissivity and available drawdown must be allowed to change with time and the equations solved in an iterative manner using, for instance, a one-year period of iteration. Using all of the same assumptions, but substituting for #4 the assumption that T and h will decrease with time in proportion to percentage of average drawdown at the end of the one-year time period, the same method was used to calculate average extraction rate, average percent drawdown and cumulative percent drawdown. This results in achieving a steady-state drawdown of approximately 6.2 feet after 57 years. In other words, using all of the inputs given but using this simplistic model correctly, the model predicts that the extraction system as designed will draw down to 762.8 feet msl and will not achieve the 761 feet msl goal. Running this model at a less conservative hydraulic conductivity of 1 x $10^{-4}$ cm/sec results in achieving a steady-state drawdown of approximately 7.8 feet after 40 years, which is still short of reaching the 761 feet msl goal.*

   *In order to achieve the 761 feet msl elevation that will provide an inward gradient in a reasonable amount of time according to the model presented by RMT, more wells will be required to meet the goal.*

   Because of the hydrogeologic complexity of the landfill (heterogeneity of refuse, presence of daily and intermediate covers, buildup of landfill gas, and the geometry of the landfill subsurface), WMII believes both an analytical solution and

mathematical/finite-element model have limitations in the prediction of the landfill's response to pumping. It is believed this can be better predicted by field verification once the remedial action is implemented. WMII has stated on several occasions (*Intermediate Design Response to Comments, Prefinal Design Response to Comments*) that any estimates for the drawdown period are subjective and can be misleading. Nonetheless, WMII and RMT prepared the requested estimate of expected times to achieve drawdown goals. When evaluating the assumptions of the drawdown calculations, one must consider the given input parameter uncertainties (e.g., hydraulic conductivity likely varies by several orders of magnitude within the landfill, and spatial heterogeneity has not been considered).

With this in mind, the initial analytical model presented by RMT was a simplified approach to a very complicated real-world setting. RMT acknowledges that leachate head and transmissivity will not be constant over the life of the remedial action. However, to simplify the requested calculations, a conservative transmissivity across the entire landfill was used. Given that the saturated waste thickness varies from 7 to 59 feet (averaging 19 feet) and the required dewatering was approximately 8 feet, a constant transmissivity based on a 12-foot saturated thickness was a reasonable assumption. It should be noted that the alternative computation provided by Roy F. Weston (USEPA oversight contractor) was also based on an incorrect assumption that there is only 12 feet of saturated waste across the entire landfill. This assumption results in an overestimate of the time required to reach the targeted dewatering.

Based on the comment contained herein, and discussions during the conference call held with the USEPA and Roy F. Weston on July 19, 2000, the calculation set for predicting drawdown periods for the H.O.D. site was revised to incorporate a step-wise time-drawdown function, as well as the variable saturated waste thickness across the landfill. This revised calculation set was submitted to USEPA for review on July 21, 2000. As the revised calculation set indicates, a period of 9 to 15 years is predicted, as compared to 9 to 13 years in the earlier calculation set.

As previously stated, the actual time frame to achieve an inward gradient is influenced by a number of indeterminate functions and variables across the landfill. True performance of the extraction can be better evaluated following collection of actual operating data after startup. At this time, WMII considers the number of extraction wells to be sufficient to meet the conditions of the ROD.

2. <u>*Response to Comment 4, Page 6*</u>: ***The soil from the borrow area should be tested to ensure that the soil is not contaminated. It is recommended that a representative number and location of soil samples be tested for TCL compound list and TAL analyte list compounds.***

A program for testing of the borrow source proposed for use in completing the H.O.D. Landfill cover work has been developed based on the above comment and discussions on this issue during the June 15, 2000, conference call on the *H.O.D. Landfill Prefinal Comments*. During the conference call, it was recommended that one sample of borrow soil be tested for target compound list and target analyte list (TCL/TAL) and compared against site background documented in the Remedial Investigation (RI) or other appropriate source. Utilizing this information, the soil testing program will consist of the collection of 5 soil samples (i.e., approximately one soil sample per acre of borrow area), taken at the mid-depth of the borrow area excavation. A sampling grid has been established for the borrow area based on the sampling frequency (Attachment 1). These discrete samples will be combined (by equivalent weights) to create one composite soil sample. This composite sample will then be tested for the recommended TCL/TAL analytes, and compared to available background soil data. A composite sampling technique was selected to be representative of the as-placed borrow soil after inherent mixing occurs during the excavation, transport, and placement of the borrow. Subsection 3.1.4 of the RD Report has been modified to incorporate the testing proposed above. In addition, Subsections 3.4 and 8.1.2 of the Construction Quality Assurance Plan (CQAP) have been appended to include the proposed confirmation borrow testing.

3. *Response to Comment 7, Page 7; and Comment 11, Page 12: The language regarding all well abandonment should be removed from the design and will be dealt with during the O&M. Also, the tabulation showing wells to be abandoned on Drawing 11 should be removed. The legend on Drawing 11 for wells to be abandoned should be modified for clarity.*

All references to abandonment of groundwater monitoring wells have been stricken from the RD Report, including the first four paragraphs in Subsection 3.8 of the RD Report, Table 3-1 of the RD Report, and the tabulation showing wells to be abandoned on Drawing 11. Drawing 11 has also been modified for subsequent clarity. This issue will be addressed during review of the O&M Plan and FSAP.

*The monitoring points discussed in Comment 11 should be accessible for monitoring during the O&M.*

As stated in Subsection 3.8 of the Prefinal RD Report, "Within the limits of waste, existing leachate probes, gas well flares, or monitoring probes will be left in place, but capped with an air tight cover...These wells will be capped off aboveground during the implementation of the RD." Based on this information, the points will remain accessible after RA construction.

4. *Response to Comment 5, Page 15: In describing the engineer's field QC tests, change the word "may" to "will" in Sections 3.9 and 3.10.*

The suggested wording has been incorporated into Specification 02320, Subsections 3.9 and 3.10.

5. *Appendix D - Cost Estimates: Despite the response, the FS included monitoring costs. Explain why the annual O&M cost estimate is over twice as high as that in the ROD.*

The basis of the annual O&M cost estimate was provided in Appendix D of the Design Report. One of the major differences between the cost estimate in the FS and the RD is for groundwater monitoring. The monitoring costs are as quoted from a laboratory and based on the list of analytes and frequencies developed in the FSAP and the QAPP. The quoted price in the RD is for $145,750/year in analytical costs while that estimated in the FS was for $44,000/year. In addition, the RD also has $6,600/year in surface water monitoring, which was not in the FS estimate.

6. *Response to Comment 2, Page 17: There was no response provided for: "Also, all overpacks, drums, etc. must meet DOT, OSHA, and USEPA regulation for wastes that they contain."*

Page E-2 of the Waste Relocation Drum Contingency Plan has been appended to include a sentence that the drums and overpacks will meet all applicable regulations for the wastes that they contain.

## Construction Quality Assurance Plan

7. *Response to Comment 3, Page 20: It is stated that the CQA officer or his/her designee are to be present at the Site daily during critical construction activities. Identify the critical activities that will require presence of the CQA officer.*

Subsection 3.3 of the CQAP has been appended to specify the critical construction activities which the CQA officer or designee are to be present for.

8. *Response to Comment 16, Page 27; and Attachment 7: The suggested laboratory testing for confirmatory sampling after relocation of waste is not acceptable. The laboratory sample should be collected using a grid sampling technique with a grid size of 100 feet by 100 feet.*

The sampling frequency has been modified to incorporate both field and laboratory testing of soil every 100 feet along the length of the waste excavation area. Figure 8-1 of the CQAP has been revised to indicate this change.

## Health and Safety Plan

9. *OSHA, 29 CFR 1910.120(b)(4) Site-Specific Plan - Must address the safety and health hazards of each phase of Site operation and include requirements and procedures for employee protection. As a minimum, the Site-specific HASP must cover the following:*

* *(ii)(A) Hazard analysis for each task*

***The Final HASP now includes information in Subsection 4.1.4 regarding arsenic and cadmium. Table 4-2 should be revised to include these metals since they are Site contaminants of concern (COC). Also, include in Table 4-2 the remaining COCs in Tables 2 and 3 of the ROD or explain why these remaining contaminants are not included.***

RMT used the maximum concentrations of all metals and inorganics detected in site soil to calculate real-time exposure levels (RTEs). The RTEs were compared to a concentration of half the most conservative PEL or TLV for each constituent (i.e., for chromium it was assumed that all chromium was present as chromate, which has the lowest PEL of all chromium compounds). The results of these calculations demonstrate that RTEs for all metals and inorganics are so low that dust monitoring will focus on the 29 CFR 1910.1001, Subpart Z, Table Z-3, Nuisance Dust guidelines. Particulate filters will therefore be worn when monitoring demonstrates that ambient dust levels exceed the OSHA PEL for total dust of 15 mg/m$^3$ or the PEL for respirable dust of 5 mg/m$^3$. All metals and inorganics (except hydrogen sulfide were accordingly removed from Table 4-2 and Subsection 4.1.4, Subsection 4.2.8, Subsection 5.4, and Table 7-1 have been amended accordingly.

***Table 4-1 should include physical hazards related to steam cleaning/pressure washing as stated in USEPA comments on the previous version of this HASP.***

Table 4-1 has been modified to include pressure washing in the task breakdown column for the potential hazard *of inhalation and contact with hazardous substances.* The potential hazard of *slips, trips, falls* also applies to pressure washing.

***In Table 4-1, it appears that additional tasks involve "Electrical shock" hazards and should be added. Also, all intrusive tasks now indicated in Subsection 7.1 should be included under "Toxic/Explosive atmospheres."***

Additional tasks that may involve "Electric shock" hazards have been added to Table 4-1. The wording "All intrusive activities, including" has been added to the "Toxic/Explosive atmospheres" potential hazards row.

* *(ii)(C) PPE to be used for each site task.*

***Action levels for particulates now in Subsection 5.4 and Table 7-1 may not adequately address the hazard since the OSHA Permissible Exposure Limit for Respirable Dust (5 mg/m³) does not appear to have been considered. Also, if elevated levels of Arsenic and/or Cadmium are present (see above), OSHA standards specific to each of these metals may dictate more stringent action levels or other requirements.***

The OSHA PELs for total and respirable dust are now one basis for upgrading to Level C protection as set forth in Table 4-2, Subsection 4.1.4, Subsection 4.2.8, Subsection 5.4, and Table 7-1.

***Action levels to upgrade to Level B (or ceasing operations) for volatile organic compounds now in Subsection 5.4 and Table 7-1 may not adequately address the hazards. Colorimetric tubes are compound specific; therefore, a general action level based on PID and/or FID monitoring is necessary and should be added.***

Subsection 5.4 has been amended to state more clearly that if ambient PID levels exceed background, colorimetric tubes will be used to check concentrations of vinyl chloride, benzene, and phenol. It also states that if ambient PID levels exceed 5 ppm above background (which is zero), staff will upgrade to Level C. Table 7-1 states that all intrusive work will be done in Level C protection until air monitoring data indicates that ambient PID levels are less than 5 ppm.

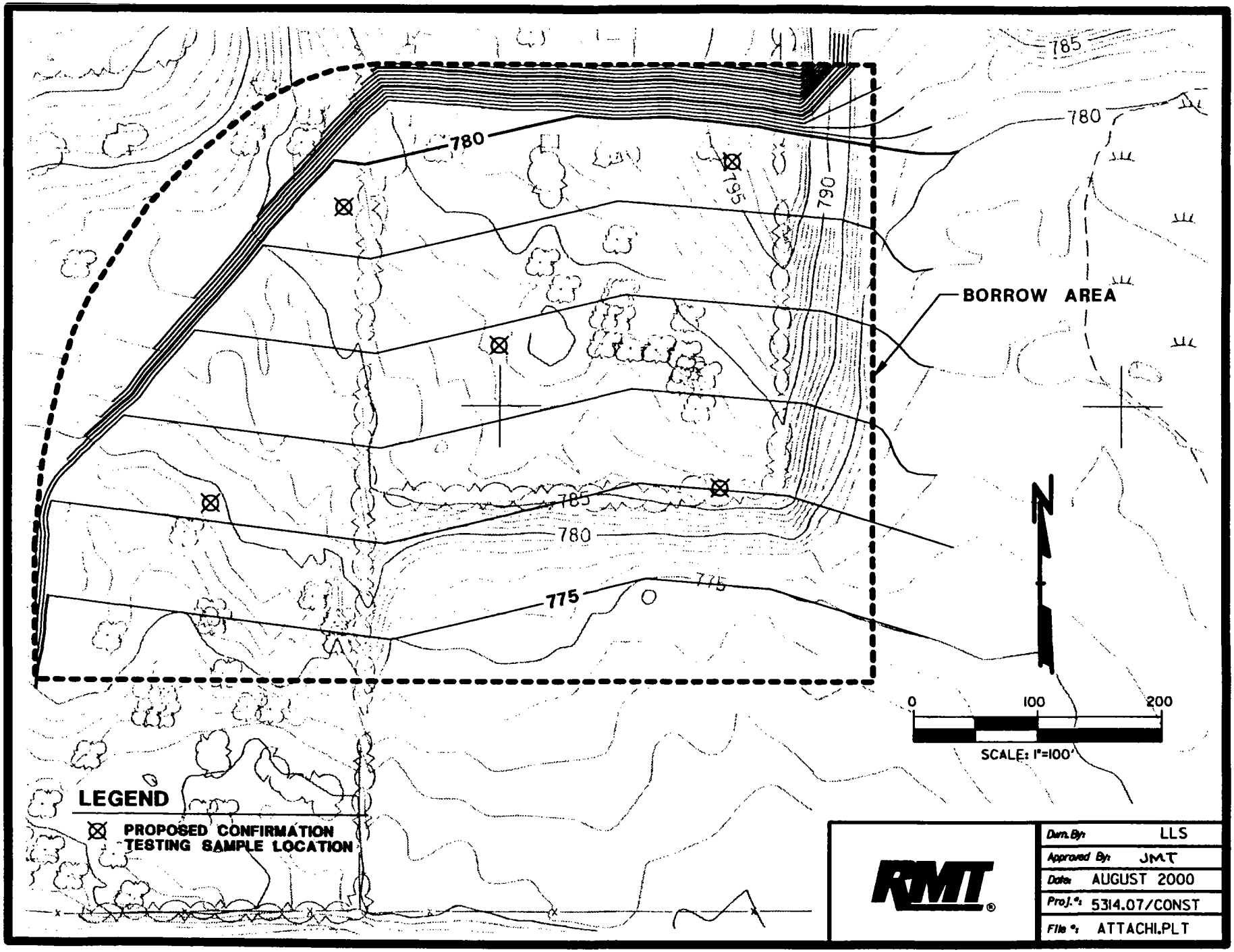
* *(ii)(G) Decontamination procedures [and (k) Decontamination].*

***Decontamination procedures for personnel in Subsection 6.2.1 still do not appear to fully minimize potential employee contact with hazardous substances or contaminated equipment. Coverall removal should take place in the Contamination Reduction Zone and hand washing in the Support Zone.***

Subsection 6.2.1 has been amended to state that outer garments (i.e., coveralls) will be removed in the contamination reduction zone and hands will be washed in the support zone.

10. *<u>Related HASP Comment</u>: Equipment decontamination procedures in FSP do not include decontamination of heavy equipment, e.g., equipment used for waste relocation or drill augers.*

Subsection 6.2.3 has been added to the HASP to cover decontamination procedures for heavy equipment and drill augers. The heading and reference of Subsection 6.2.2 has been modified for consistency.




**Levels**
(1) 1-4,7-9,11-61,63
(2) 11,13,18,20-22,25,27,23,34,45
(3) 7
(4) 25-27

**Logical Names**
(1) bdr
(2) bmc
(3) bmr
(4) plp

**Reference Files**
Ref. File 1= borderl.dgn
Ref. File 2 = bmclient.dgn
Ref. File 3 = bmrmt.dgn
Ref. File 4 = pipe.dgn

**Plot Data**
Design File = J:\05314\07\Const\attachl.plt
STORMPRT Date = Tue Aug 108:52:34 2000
Plot File = J:\05314\07\Const\attachl.prf
Pen Table =K:\CADNET\TBL\default.tbl
Levels On = 1-61

| | |
|---|---|
| Dwn. By: | LLS |
| Approved By: | JMT |
| Date: | AUGUST 2000 |
| Proj.#: | 5314.07/CONST |
| File #: | ATTACHI.PLT |

RMT COMPUTER AIDED DESIGN & DRAFTING

**ATTACHMENT 1**

# Remedial Design Report

### 3.1.4 Borrow Soil

Suitable soil necessary for the completion of the landfill cover will be obtained from an area on WMII property directly to the north of the "new" landfill (see Plan Sheet No. 3). Approximately one soil sample per acre of borrow area will be collected and composited for contamination testing. The composite sample will be tested for the Target Compound List and Target Analyte List (TCL/TAL) and compared against available site background information. Topsoil from this area will be stripped and stockpiled prior to removal of fill soil. At the completion of the site grading work, the disturbed borrow area will be graded such that positive drainage is re-established. Topsoil will then be respread, and the borrow areas will be seeded similar to that proposed for the landfill cover. The proposed borrow area on the property is expected to have 69,100 CY of soil available for use in establishing the final grades.

If enough fill soil is not available from the on-site borrow area, additional soil will be available from Waste Management's Pheasant Run RDF located in the town of Paris, Kenosha County, Wisconsin. Pheasant Run RDF is located approximately 20 miles from the H.O.D. Landfill. Figure 3-1 shows the location of Pheasant Run RDF, and the proposed haul routes to the H.O.D. Landfill.

### 3.1.5 Vegetative Layer

After site regrading activities are completed, an uncompacted 12-inch-thick soil layer will be placed on the disturbed areas and seeded to establish vegetation. This soil layer will provide protection to the underlying cover system and will also provide a rooting zone for the cover vegetation. The vegetative layer soil will be obtained from on-site stockpile areas or from off-site borrows, as described in Subsection 3.1.4. The stockpiled topsoil removed during the initial site preparation and regrading will be reused. The vegetative layer will be vegetated to prevent erosion. A seed mixture that is appropriate for the climatic conditions of Antioch has been selected and is provided in the RD specifications. The seed mixture may be revised to better fit site conditions based on final end use plans.

A summary of the estimated quantities (in-place) of materials needed to construct the cover system at the H.O.D. Landfill are included in Appendix C.

## 3.2 Surface Water Management

The final cover has been designed to direct surface water off-site via sheet flow. The designed top slopes of the final cover are generally 2 percent, while the established sideslopes are no steeper than 4:1. Other areas of the landfill where slopes are steeper than 4:1, including the

## 1.8Well Abandonment

A number of groundwater monitoring wells that are not included in the long-term groundwater monitoring plan, and which would be unlikely to provide essential information in the future, will be abandoned during the construction phase of the RA. The monitoring wells that will be abandoned are shown in Plan Sheet No. 11 and on Table 3-1.

All monitoring wells will be abandoned in compliance with the Illinois Water Well Construction Code (77 Ill. Adm. Code 920.120). The wells will be abandoned by a licensed water well driller by grouting from the bottom up using neat cement grout or any bentonite product manufactured for water well sealing. This material will be applied to the full depth of the well and will terminate within 2 feet of the ground surface. The well casing will be removed to at least 2 feet below final grade. Concrete grout may be used in the upper 2 feet of the well.

Monitoring wells that are abandoned will be disinfected by introducing a sufficient amount of chlorine to produce 100 parts per million of chlorine in the water in the well.

The Illinois Department of Public Health (IDPH), approved local health department, or approved unit of local government will be notified by telephone or in writing at least 48 hours prior to the commencement of work to seal a monitoring well. A sealing form provided by the IDPH will be submitted to the IDPH, or approved local health department, not more than 30 days after the well is sealed.

Within the limits of waste, existing leachate probes, gas well flares, or monitoring probes will be left in place, but capped with an air tight cover. These wells will be left in place for utilization as additional collection points if deemed necessary for gas and/or leachate collection. These wells will be capped off aboveground during the implementation of the RD. If future utilization is not necessary, these wells will be properly abandoned.

~~Table 3-1~~
~~Monitoring Wells to be Abandoned~~

| ~~MONITORING WELL~~ | ~~RATIONALE FOR ABANDONMENT~~ |
|---|---|
| ~~W7D~~ | ~~US5D serves as the background well screened in the DSGA.~~ |
| ~~G14S~~ | ~~Well is screened in the surficial sand; however, it has historically shown anomalous hydraulic head elevations.~~ |
| ~~G14D~~ | ~~Well is screened in the clay diamicton (confining unit).~~ |
| ~~PZ5U~~ | ~~Well is screened in the surficial sand; however, it is screened below the water table.~~ |
| ~~PZ6U~~ | ~~Well is screened in the surficial sand; however, it is screened below the water table.~~ |
| ~~R103~~ | ~~Duplicative of US6S.~~ |
| ~~W6S~~ | ~~Duplicative of US6S.~~ |
| ~~G102~~ | ~~Duplicative of US4S.~~ |
| ~~G11D~~ | ~~Well is screened in the clay diamicton (confining unit).~~ |
| ~~G11S~~ | ~~Well screen is set too high to adequately monitor the water table. The well has historically been frequently dry.~~ |
| ~~US7S~~ | ~~Well is screened in the surficial sand; however, it is screened below the water table.~~ |

3.9 FIELD QUALITY CONTROL OF SELECT GRANULAR FILL

A. ENGINEER ~~may~~ will perform the following tests:

Select Granular Fill

1. For every 2,500 cubic yards placed, sieve analysis (ASTM D422).

3.10 FIELD QUALITY CONTROL SELECT AGGREGATE FILL

A. ENGINEER ~~may~~ will perform the following tests under provisions of Section 01452.

Select Aggregate Fill

1. For every 2,500 cubic yards placed, sieve analysis (ASTM C136).

3.11 FIELD QUALITY CONTROL OF LOW PERMEABILITY FILL

A. ENGINEER will~~may~~ perform the following tests under provisions of Section 01452:

Undisturbed (Shelby tube) Sample Analysis:

1. For every acre or less for every 1-foot thickness of Low Permeability Fill placed:

   - Classification (ASTM D2487)
   - Sieve and hydrometer (ASMT D422)
   - Atterberg limits (ASTM D4318)
   - Dry density and moisture content (ASTM D4643)

2. For every 1 acre or less of Low Permeability Fill placed, a falling head hydraulic conductivity test (ASTM D5084).

Representative Sample Analysis:

1. For every 5,000 cubic yards placed, a moisture density relationship using Modified Proctor Test (ASTM 1557).

B. Grade and finish to within 0.10 foot of grades shown.

- Drum overpacks (to contain leaking or damaged drums)

Nonsparking tools and material handling equipment will be available if it is determined that a flammable atmosphere may be present based on the known or anticipated contents of the drum(s). All drums and overpacks will meet all applicable regulations for the wastes that they contain.

## Drum Removal and Staging

Drums containing waste, whether intact or leaking, will be removed from the excavation using a removal method corresponding to the condition of the drum (e.g., drum grappler, drum sling, or an excavation bucket of sufficient capacity). Prior to drum removal, the immediate area surrounding the drums will be bermed off to provide additional spill containment. Extreme care will be taken when removing drums and the soil surrounding them to minimize disturbing the contents. Excavated drums will be staged within the limits of waste, and the staging area will be lined with plastic and surrounded by a berm to prevent the migration of potential releases. Impacted soil resulting from spills will be excavated and placed within a lined roll-off container until they can be characterized.

As the drums are excavated, they will be numbered in the sequence in which they are removed. During the initial characterization, drums identified and labeled as containing immediately dangerous materials or suspected of containing hazardous materials based on visual characterization will be clearly marked for special handling. Drum remnants containing less than 1 inch of residue, including crushed, deteriorated, or partial drums, will be transported to the on-site consolidation areas and managed with other excavation and trenching spoils. Empty drums will be crushed before consolidation to avoid potential voids. Open drums containing solids, soil, or landfill debris will be inspected to determine if free liquids are present. If free liquids are not present, the drum and its contents (solids, soil, or landfill debris) will be transported to the consolidation areas. Drums containing multiple phases (free liquids) will be managed in accordance with the procedures outlined in this plan (see subsection, Analytical Testing for Disposal).

## Drum Inspection

Inspection activities will be recorded on a Drum Logging Form. The following information will be recorded on these forms:

- Condition of drum
- Drum identification number
- Description of contents
- Amount of contents
- Drum size

2116000N

2115500N


0 200 400 600 800

SCALE: 1" = 200'

2115000N

NOTE: THE CONTRACTOR SHALL NOTIFY ALL AREA UTILITY COMPANIES PRIOR TO COMMENCING WORK ON THIS CONTRACT, IN ACCORDANCE WITH STATE AND LOCAL REQUIREMENTS.

NOTE: THESE PLANS ARE ACCOMPANIED BY A REPORT OF THE SAME TITLE. THESE DOCUMENTS ARE INTERRELATED AND ARE INTENDED TO BE USED TOGETHER.

| NO. | BY | DATE | REVISION | APP'D. |
|---|---|---|---|---|
| 3. | | | | |
| 2. | | | | |
| 1. | | | | |

PROJECT:
**WASTE MANAGEMENT OF ILLINOIS, INC.**
**H.O.D. LANDFILL-REMEDIAL DESIGN**
**FINAL DESIGN SUBMITTAL**

2114500N

SHEET TITLE:
**ENVIRONMENTAL MONITORING PLAN**

| | | |
|---|---|---|
| DRAWN BY: STORMERL | SCALE: 1"=200' | PROJ. NO. 5314.07 |
| CHECKED BY: JMT | | FILE NO. ENVIRMON.PLT |
| APPROVED BY: MJT | DATE PRINTED: AUG - 2 2000 | SHEET 11 OF 15 |
| DATE: JULY 2000 | | |

**WASTE MANAGEMENT**

WM

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# Construction Quality Assurance Plan

# Section 3
# Construction Manager and CQA Roles, Responsibilities, and Qualifications

## 3.1 Project Manager

The project manager for the RA will serve as the lead contact person with the owner, regulatory agencies, oversight consultants (regulatory), and the Construction Manager. Figure 3-1 shows the general lines of communication between the Project Manager and others during the construction of the RD.

## 3.2 Construction Manager

The CM will be responsible for construction implementation of the RA at the site, in accordance with the RD Report, construction specifications, and plan set. The CM will be responsible for the means and methods of construction, equipment, materials, quality control (QC) of construction, and personnel as specified in the Remedial Design (RD). The CM will be experienced in the construction of the components associated with the RD, including excavation, waste relocation, soil placement and compaction, landfill gas collection systems, and leachate collection systems.

## 3.3 CQA Officer

The CQA Officer will supervise and be responsible for observation, testing, and related construction documentation of various materials, procedures, and equipment during construction, as described in this CQA Plan. During critical periods of construction (e.g., waste relocation activities, low permeability soil placement, final cover grade preparation, dual extraction well installation, header pipe placement activities, leachate storage tank installation, blower/flare system installation), the CQA Officer or his/her designee will be at the site as deemed necessary for certification. During construction activities that are not considered critical, the CQA Officer or his/her designee will be at the site on a daily basis as necessary for certification. The CQA Officer will be responsible for the preparation of the Remedial Action Report to certify substantial compliance with the approved RD. The CQA Officer will be a Professional Engineer registered in the state of Illinois, and will act independently from the contractor. Typical functions of the CQA Officer are to:

- Review design criteria, plans, and specifications for clarity and completeness
- Direct and perform observations and tests for quality assurance inspection activities

Perform independent on-site inspections of the work to assess compliance with design criteria, plans, and specifications

- Verify that equipment used in testing meets the test requirements and that the tests are conducted according to standardized procedures
- Report to the PRP and EPA the results of all inspections and corrective actions, including all work that is not of acceptable quality or that fails to meet the specified design requirements

The CQA Officer may delegate daily inspection, testing, observation, and sampling duties to a qualified technician with experience in the assigned aspect of construction who will serve as the CQA Officer-in-Absentia. Although these duties may be delegated, the CQA Officer will retain the responsibility for these activities. The CQA Officer-in-Absentia will immediately notify the CQA Officer of any problems or deviations from design plans and specifications.

The CQA Officer will attend the preconstruction meeting and the Prefinal and Final Inspections, and will be readily available for consultation during construction.

## 3.4 Soil Testing and Analytical Laboratoriesy

The soil testing laboratory will be responsible for remedial action construction soil testing. The soil testing laboratory will be required to provide QA test results within reasonable time frames. This will include providing verbal communication on the status of ongoing tests and immediate communication of test results as needed to facilitate ongoing construction. Such information may include permeability test data, Proctor values, and borrow source characterization data.

The analytical laboratory will be responsible for performing chemical analysis on soil samples to determine if areas of waste removal have been cleaned as required and for background testing of the proposed borrow. The analytical laboratory will be required to perform tests in a time frame that will not impede cover placement and restoration of the waste removal areas.

## 3.5 Construction Contractor(s)

The role of the Construction Contractor(s) will be to perform final cover construction earthwork activities and construction of the leachate/landfill gas collection systems. The Construction Contractor(s) will be experienced in solid waste landfill construction and be competent in low-permeability cover construction and landfill gas/leachate collection system installation.

## 3.6 Site Survey

The site grading during construction activities will be surveyed on a regular basis. Two forms of survey will occur during construction. QA surveys will be done under the direction of the

*Erosion Gully Repair*

- Observe preparation of gullies to receive backfill soils.
- Confirm that backfill soils are placed to meet the final cover requirements based on the depth of the gully.
- Observe that adequate compaction of backfill soils is carried out.
- Observe revegetation/seeding of gully if necessary.

### 8.1.2 Documentation Procedures

The CQA Officer will document contamination removal confirmation testing, borrow source contamination testing, and preparation grading as follows:

*Field Equipment Screening*

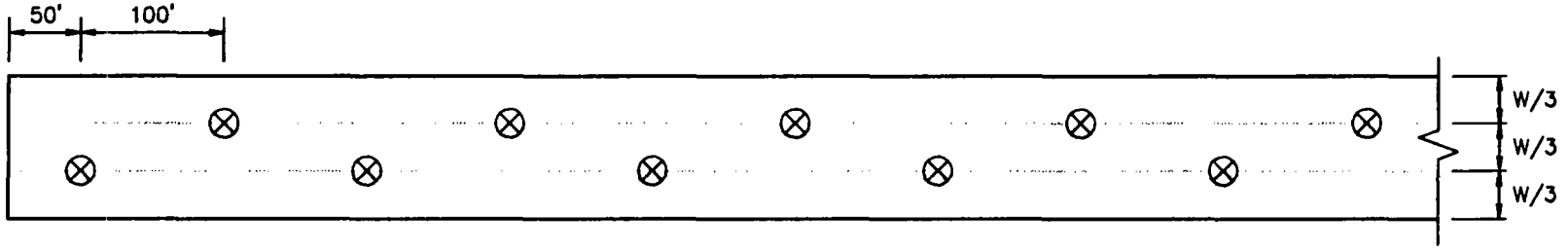
- Per the sampling grid shown on Figure 8-1, screen subgrade soil samples for VOCs in the field using a photoionization detector (PID). Samples will be collected from the subgrade and directly placed in jars or Ziploc bags, which will be sealed and allowed to equilibrate for approximately ½ hour. Confirm that the samples have instrument readings (i.e., ppm) of 10 or less by inserting the PID probe into the container and monitoring the air in the headspace of each sample. For samples having readings above 10 ppm, overexcavation is to continue at the direction of the CQA Officer or Officer-in-Absentia. Confirm adequate removal by collecting additional samples in each direction (i.e., to the north, south, east, and west) at a spacing of 10 feet from the original sampling location.

*Laboratory Confirmation Testing*

- Per the sampling grid shown on Figure 8-1, cCollect samples of the waste excavation area subgrade and submit to laboratory for testing to determine if acceptable removal has occurred. The soil samples will be tested for the list of analytes included in Table 8-1.
- Collect samples of the proposed borrow soil (Figure 8-2) and submit to laboratory for testing to determine if the borrow source is contaminated. The composite soil sample will be tested for the Target Compound List and Target Analyte List (TCL/TAL).

*Preparation Grade Slopes*

- Spot check preparation grade slopes; compare with RD Drawing grades.
- Confirm that nonconforming slopes are repaired.




## TYPICAL CONFIRMATORY SOIL TESTING GRID

NOT TO SCALE

NOTES:
1. ONE LABORATORY TEST PER 100 FEET OF EXCAVATION LENGTH (MIN.)
2. W=WIDTH (NORTH–SOUTH) OF THE EXCAVATION AREA

LEGEND

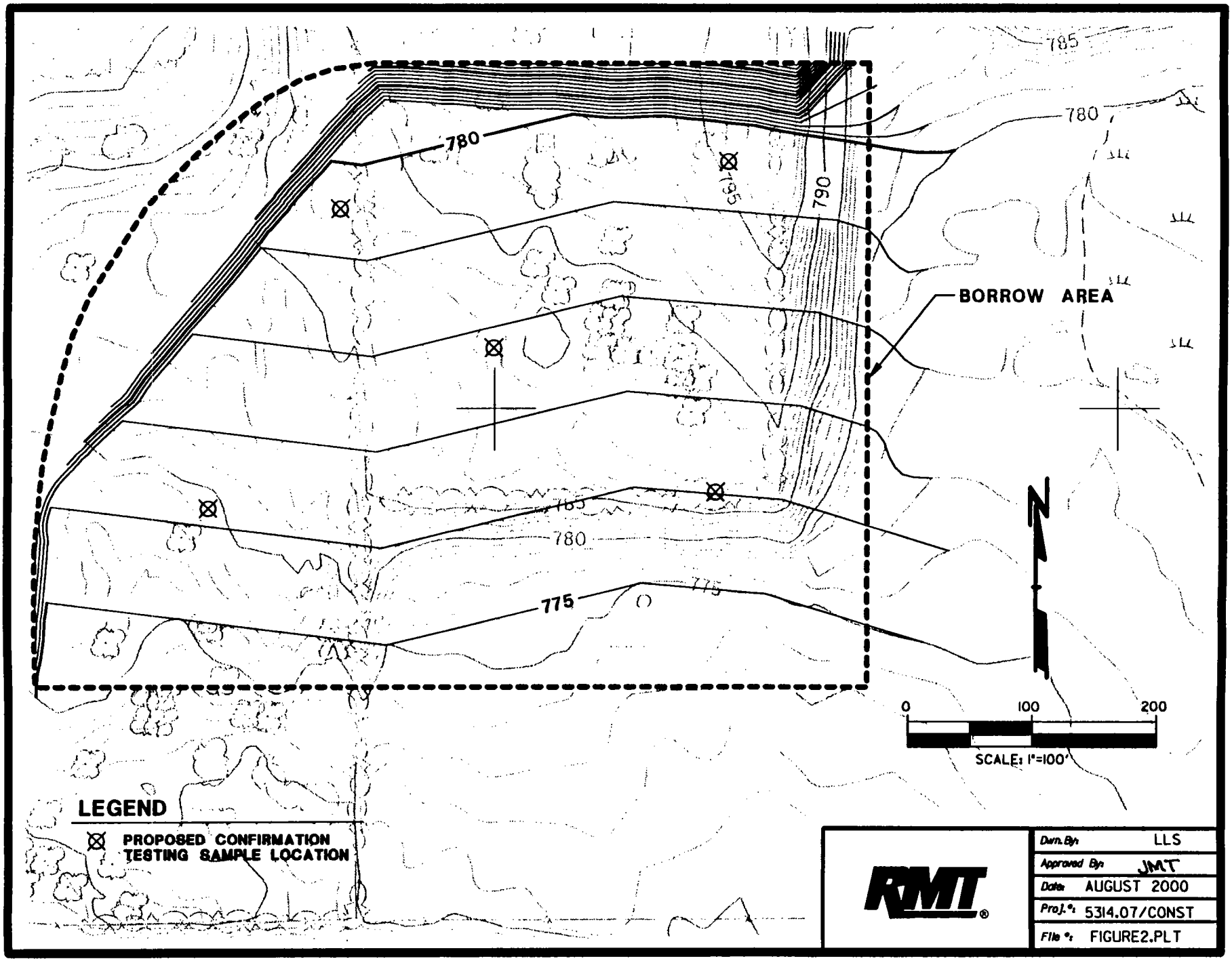
⊗ FIELD EQUIPMENT AND LABORATORY TEST LOCATION

**H.O.D. LANDFILL**
**CONSTRUCTION QUALITY ASSURANCE PLAN**

RMT

| | |
|---|---|
| DWN. BY: | BOERSMAP |
| APPROVED BY: | JMT |
| DATE: | JULY 2000 |
| PROJ. # | 5314.09 |
| FILE # | 53140903.DWG |

**FIGURE 8-1**




**Levels**
(1) 1-4,7-9,11-61,63
(2) 11,13,18,20-22,25,27,28,34,45
(3) 7
(4) 25-27

**Logical Names**
(1) bdr
(2) bmc
(3) bmr
(4) pip

**Reference Files**
Ref. File 1 = borderl.dgn
Ref. File 2 = bmclient.dgn
Ref. File 3 = bmrmt.dgn
Ref. File 4 = pipe.dgn

**Plot Data**
Design File = J:\05314\07\Const\figure2.plt
STORMPRINT Date = Tue Aug 108:57:10 2000
Plot File = J:\05314\07\Const\figure2.prf
Pen Table = K:\CADNET\TBL\default.tbl
Levels On = 1-61

RMT COMPUTER AIDED DESIGN & DRAFTING

**FIGURE 8-2**

# Health and Safety Plan

Table 4-1 (Continued)
General Job Safety Hazards and On-site Control Measures

| POTENTIAL HAZARDS | HAZARD CONTROL MEASURES | PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT | TASK BREAKDOWN |
|---|---|---|---|
| Slips, trips, falls | ■ Clear walkway work areas of equipment, tools, vegetation, excavated material, and debris.<br>■ Mark, identify, or barricade other obstructions. | | All job functions |
| Inhalation and contact with hazardous substances | ■ Provide workers proper skin, eye, and respiratory protection based on the exposure hazards present.<br>■ Review hazardous properties of site contaminants with workers before operations begin. | Tyvek coveralls, nitrile gloves, latex or neoprene boots, respirators (see Section 7 of the HSP) | Sampling and monitoring, leachate tank installation, extraction well and gas probe installation, waste relocation, drum handling, pressure washing |
| Utilities | ■ Mark and locate underground utilities. This will be done by Contractor.<br>■ Flag overhead utilities as necessary. | | Extraction well and gas probe installation, site grading, blower/flare construction, fence installation, waste excavation |
| Excavation cave-in | ■ Comply with 1926.650, Subpart P. | | Leachate tank installation, pipe installation, waste excavation |
| Fires | ■ Eliminate sources of ignition from the work area.<br>■ Prohibit smoking.<br>■ Provide ABC (or equivalent) fire extinguishers for all flammable storage areas, powered cutting equipment refueling areas, fuel-powered generators, and compressors.<br>■ Store flammable liquids in well ventilated areas.<br>■ Prohibit storage and transfer of flammable liquids in plastic containers.<br>■ Enforce use of approved flammable liquid safety cans.<br>■ Post "NO SMOKING" signs.<br>■ Store combustible materials away from flammables. | | All job functions |

Table 4-1 (Continued)
General Job Safety Hazards and On-site Control Measures

| POTENTIAL HAZARDS | HAZARD CONTROL MEASURES | PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT | TASK BREAKDOWN |
|---|---|---|---|
| Electrical shock | ■ De-energize or shut off utility lines at their source before work begins.<br>■ Use double insulated or properly grounded electric power-operated tools.<br>■ Maintain tools in a safe condition.<br>■ Provide an equipment-grounding conductor program or employ ground-fault circuit interruptors.<br>■ Follow lockout/tagout procedures as applicable when working with electrical or mechanical equipment.<br>■ Use qualified electricians to hook up electrical circuits.<br>■ Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation.<br>■ Cover or elevate electric wire or flexible cord passing through work areas to protect from damage.<br>■ Keep all plugs and receptacles out of water.<br>■ Use approved water-proof, weather-proof equipment if exposure to moisture is likely.<br>■ Inspect all electrical power circuits prior to commencing work. | | Blower/Flare building construction, extension of electrical power to site, temporary electrical circuits to field trailers and support stations |
| Work on or near surface water bodies | ■ If water is more than 2 ½ feet deep, wear U.S.C.G.-approved flotation devices.<br>■ Conduct work under the buddy system.<br>■ Use restraining systems if current is strong. | Flotation devices | Surface water sampling, sediment sampling |

Table 4-1 (Continued)
General Job Safety Hazards and On-site Control Measures

| POTENTIAL HAZARDS | HAZARD CONTROL MEASURES | PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT | TASK BREAKDOWN |
|---|---|---|---|
| Materials handling (concrete and bentonite products) | ■ Wear dust/filter masks when handling powdered concrete and/or bentonite materials.<br>■ Avoid dermal contact with these materials. | Dust/filter mask (particulate)<br>Gloves (leather or rubber) | Groundwater and gas monitoring well construction |
| Traffic | ■ If working in or near traffic areas, wear orange safety vests for visibility.<br>■ Be alert.<br>■ Use traffic control devices, if necessary. | Orange safety vests with reflective strips | Construction of access roads |
| Handling heavy objects | ■ Observe proper lifting techniques.<br>■ Obey sensible lifting limits (60 lb maximum per person manual lifting).<br>■ Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads. | Steel-toe boots | All job functions |
| Toxic/Explosive atmospheres | ■ Conduct air monitoring.<br>■ Install and maintain access controls. | Respiratory protection | All intrusive activites, including ~~Sampling~~ sampling and monitoring, gas probe and extraction well installation~~,~~; drum handling |

Table 4-2
Exposure Limits
Remedial Action
H.O.D. Landfill
Antioch, Illinois
March 2000

| COMPOUNDS | MEDIA | PEL[1] | TLV[2] | STEL |
|---|---|---|---|---|
| ***Volatile Compound*** | | | | |
| Acetone | L,S,LG | 1000 ppm | 500 ppm | -- |
| 2-Butanone (MEK) | L,LG | 200 ppm | 200 ppm | -- |
| 4-Methyl-2-pentanone | L | None established | | |
| 2 Hexanone | L | 100 ppm | 5 ppm | -- |
| Toluene | L,S,LG | 200 ppm | 50 ppm | -- |
| Xylene | L,S,LG | 100 ppm | 100 ppm | -- |
| Ethylbenzene | L,S,LG | 100 ppm | 100 ppm | -- |
| Benzene | L,S,LG | 1 ppm | 0.5 ppm | 5 ppm |
| Tetrachloroethene | L,LG | 100 ppm | 25 ppm | -- |
| Trichloroethene | L,GW,LG | 100 ppm | 50 ppm | -- |
| 1,2-Dichloroethene | L,GW,LG | 200 ppm | 200 ppm | -- |
| 1,1-Dichloroethene | L,LG | 100 ppm | 100 ppm | -- |
| Vinyl chloride | L,GW,LG | 1 ppm | 1 ppm | |
| Methylene chloride | L,S,LG | 25 ppm | 50 ppm | 125 |
| Phenol | L | 5 ppm | 5 ppm | -- |
| 2,4-Dimethylphenol | L | None established | | -- |
| 4-Methylphenol | L | 5 ppm | 5 ppm | -- |
| Diethylphthalate | L | None established | 5 mg/m$^3$ | -- |
| Naphthalene | L | 10 ppm | 10 ppm | -- |
| Ethyl chloride (chloroethane) | LG | 1,000 ppm | 100 ppm | -- |
| ***Other*** | | | | |
| Hydrogen sulfide | LG, L, GW | 10 ppm | 10 ppm | -- |
| Total dust | S | 15 mg/m$^3$ | -- | -- |
| Respirable dust | S | 5 mg/m$^3$ | -- | -- |
| ~~Chromium~~ | ~~L,S,GW~~ | ~~1.0 mg/m$^3$~~ | ~~0.5 mg/m$^3$~~ | -- |
| ~~Calcium~~ | ~~L,GW~~ | ~~15 mg/m$^3$~~ | ~~10 mg/m$^3$~~ | -- |
| ~~Magnesium~~ | ~~L,GW~~ | -- | ~~10 mg/m$^3$~~ | -- |
| ~~Manganese~~ | ~~L,GW~~ | ~~5 mg/m$^3$~~ | ~~0.2 mg/m$^3$~~ | -- |
| ~~Iron~~ | ~~L,GW~~ | ~~10 mg/m$^3$~~ | ~~5 mg/m$^3$~~ | -- |
| ~~Aluminum~~ | ~~L~~ | ~~15 mg/m$^3$~~ | ~~2 mg/m$^3$~~ | -- |

## Table 4-2 (Continued)
## Exposure Limits
## Remedial Action
## H.O.D. Landfill
## Antioch, Illinois
## March 2000

| COMPOUNDS | MEDIA | PEL[1] | TLV[2] | STEL |
|---|---|---|---|---|
| *Other* | | | | |
| ~~Potassium~~ | ~~L,GW~~ | ~~None established~~ | | – |
| ~~Sodium~~ | ~~L,GW~~ | ~~None established~~ | | – |
| ~~Carbon disulfide~~ | ~~GW,LG~~ | ~~20 ppm~~ | ~~10 ppm~~ | ~~100 ppm~~ |

Notes:

| | |
|---|---|
| PEL | Permissible exposure limit |
| PPM | Parts per million |
| STEL | Short-term exposure limit |
| TLV | Threshold limit value |
| L | Leachate |
| LG | Landfill gas |
| S | Soil |
| GW | Groundwater |
| SD | Sediment |
| $mg/m^3$ | Milligrams per cubic meter |

Footnotes:

(1) Permissible Exposure Limits (PELs) and Short-Term Exposure Limits (STEL), U.S. Department of Labor, OSHA.

(2) American Conference of Governmental Hygienists (ACGIH) Threshold Limit Values (TLV) for 1999.

to these compounds include headache; irritation to eye, nose, throat, and mucous membranes; weakness; muscle aches; abdominal pain; confusion; nausea; and respiratory and central nervous system effects. Ambient concentrations of VOCs will be monitored in areas where leachate and waste occur using a photoionization detector.

### *Semivolatile Organic Compounds (SVOCs)*

The primary potential routes of exposure to VOCs are inhalation of gases and vapors, and skin contact with contaminated soil, liquids, or articles. The primary potential route of exposure to SVOCs is skin contact. Secondary routes of exposure would be inhalation of particles containing SVOCs under conditions of high airborne dust and accidental ingestion from contact with contaminants or contaminated articles. Symptoms of overexposure to organic compounds from acute and chronic exposures to high concentrations include eye, nose, and upper respiratory irritation, abdominal pain, headaches, nausea, vomiting, central nervous system depression, inebriation, incoherence, vertigo, weakness, numbness, tremor, low blood pressure, cardiac arrhythmia, shock, coma, dermatitis, bronchitis, liver damage, kidney damage, and lung damage.

SVOCs detected in leachate samples include the following:

- Phenol
- 2,4-Dimethylphenol
- 4-Methylphenol
- Naphthalene
- Diethylphthalate

### *Metals and Inorganics*

The primary potential route of exposure to metals would be accidental ingestion from contact with contaminants or contaminated articles. A secondary route of exposure would be inhalation of particles containing metals under conditions of high airborne dust. Symptoms of chronic overexposure to high concentrations of metals and inorganics ~~from chronic exposure to high concentrations~~ include gastro-intestinal irritation; abdominal pain and cramps; nausea; diarrhea; headaches; tremor; eye, nose, and upper respiratory irritation; general weakness; insomnia; changes in skin or gum pigmentation; anemia; kidney damage; pneumoconiosis; asthma; coughing; and muscle aches. ~~Arsenic and cadmium are potential occupational carcinogens.~~ Site-specific

concentrations of metals and inorganics in soil were used to calculate real-time exposure levels for particulates. Based on conservative calculations, metals and inorganics do not present a threat to inhalation at the H.O.D. site. Therefore, particulate monitoring will focus on the 29 CFR 1910.1001, Subpart Z, Table Z-3, Inertor Nuisance Dust guidelines. Particulate filters will be worn by site staff when total dust levels exceed the PEL of 15 mg/m$^3$ or when respirable dust levels exceed the PEL of 5 mg/m$^3$.

### 4.1.5 Radiological Hazards

Based on information presented in the RI, no radiological hazards are anticipated at the site. If evidence of radiological hazards is encountered, work will be stopped until the RMT CHSM determines what health and safety procedures are appropriate and authorizes work to recommence.

### 4.1.6 Drums and Containers

Should drums need to be removed from excavations or trenches, an exclusion zone will be established around the excavation area. This zone will be surrounded by caution tape or temporary fencing.

Upon discovery of drums, a licensed waste removal and hauling firm will be contacted to conduct the drum removal. RMT staff will not conduct drum characterization or removal activities. All personnel assigned to support tasks in the exclusion zone during drum removal activities will wear Level C protective equipment at a minimum as described in Section 7 and will properly decontaminate when leaving the exclusion zone. A less stringent level of protection may be dictated by action levels as specified in the Health and Safety Plan (HSP) and determined by measuring the level of contaminants in the breathing zone with portable health and safety monitoring equipment. A particulate monitor, photoionization detector (PID) or flame ionization detector (FID), and a combustible gas meter (LEL monitor) will all be used for air monitoring during drum characterization or removal activities as dictated by Section 5.

## 4.2 Physical Hazards

### 4.2.1 Snakes, Ticks, and Other Insects

The H.O.D. Landfill and surrounding areas contain wetlands, grassy areas, and creeks. Due to these site features, snakes may be encountered at the work site. For protection against snake bites, personnel will be provided with snake boots or snake leggings, as appropriate.

per hour is recommended. In addition, the following actions can help reduce heat stress:

- In extremely hot weather, conduct nonemergency response operations in the early morning and evening.
- In hot weather, rotate workers wearing protective clothing.
- Clothing should be permitted to dry during rest periods. Workers who notice skin problems should immediately consult the Site HSR.

### 4.2.8 Dust

Dust ~~will~~ may be present at the site due to the operation of heavy equipment. A water truck will be employed to control the generation of dust. Air monitoring as discussed in Section 5 will be performed, and will aid in determining the amount of dust control needed at the site. Based on air monitoring results, level of protection modifications will be performed as described in Subsection 7.2.

### 4.2.9 Other Physical Hazards

Hazards related to sharp objects; slips, trips, and falls; and lifting heavy objects will be reduced by engineering controls. Employees will be required to wear safety glasses and gloves when working with sharp objects. To minimize slips, trips, and falls, walkways will be kept clear of equipment, tools, vegetation, excavated material, and debris. Also, obstructions will be clearly marked, identified, or barricaded. To minimize personal exposures, staff will wash exposed skin areas immediately after cessation of daily work activities. Finally, heavy lifting will be limited to 60 pounds per person and proper lifting techniques will be employed. Mechanical equipment will be used to move large, awkward loads.

- Upwind of work areas to establish background air contaminants
- In support zone to check for contamination
- Along decontamination line to check that decontamination workers are properly protected and on-site workers are not removing protective equipment in a contaminated area
- At exclusion zone to verify level of protection and exclusion zone boundaries

## 5.3 Air Monitoring Equipment

- An Hnu or OVM photoionization detector (PID) with an 11.7 eV lamp (or equivalent) will be used by the Site HSR to monitor air quality at the work site. This will be done to assess the relative levels of organic airborne contaminants and to aid in site assessment.
- An Industrial Scientific Meter (or equivalent) will be used to detect any presence of explosive landfill gases and determine oxygen and hydrogen sulfide levels.
- Selected colorimetric tubes will be available for use in testing for the presence of specific toxic compounds, such as vinyl chloride, benzene, and phenol.
- A real-time aerosol monitor (MiniRam or equivalent) will be used to monitor airborne particulates.

## 5.4 Response to Airborne Contaminants

The following general guidelines will be used by the Site HSR as part of the decision-making criteria for establishing the appropriate level of protection. Note that increasing or decreasing levels of oxygen or combustible gases may indicate the presence of other substances (i.e., organic vapors in elevated concentrations).

- *Organic vapors* – If instrument readings are less than or equal to background (i.e., zero), Level D protection as defined in Subsection 7.1 will be used. If PID instrument readings are greater than 5 instrument units above background, ~~Level C protection as defined in Subsection 7.1 will be used. When instrument readings are greater than background with the organic vapor monitor,~~ colorimetric tubes will be used to check for the specific presence of benzene, vinyl chloride, and phenol. If benzene levels are above 1 ppm, Level C protection will be used. If vinyl chloride levels are above 1 ppm, Level C protection will be used. If phenol levels are above 5 ppm, Level C protection will be used. If vinyl chloride levels approach 10 ppm or benzene levels approach 50 ppm, employees will be required to upgrade to Level B protection. If PID instrument readings exceed 5 instrument units above background levels, and colorimetric monitoring indicates that concentrations of vinyl chloride, benzene, and phenol are less than the values listed above, Level C protection will be used.
- *Combustible gas* – If instrument readings are above 25 percent of the LEL, operations will cease and workers will move to a safe area. The workplan will be re-evaluated, and engineering controls will be implemented to reduce levels below 10 percent of the LEL.

- ***Hydrogen sulfide*** – If instrument levels are above 10 ppm, operations will cease, and workers will move to a safe area. The workplan will be re-evaluated, and engineering controls will be implemented to reduce HS levels below 10 ppm.
- ***Oxygen-deficient atmospheres*** – If instrument levels are 19.5 percent oxygen or less, operations will cease, and workers will move to a safe area until oxygen levels are above 19.5 percent oxygen.
- ***Airborne particulates*** – If instrument readings are greater than ~~7.5~~ 15 mg/m$^3$ total dust or 5 mg/m$^3$ respirable dust~~(safety factor of two)~~, Level C protection as defined in Subsection 7.1 will be used. In addition, engineering controls (e.g., water) will be used to reduce levels. Refer to Subsection 7.2 for a further description of criteria required for modifications to the level of protection.

## 5.5 Documentation

Air monitoring readings will be recorded in field log-books. The names of personnel working in the area, the date, the time, the location, the task being conducted, the concentration levels, and any observations noted will be included.

remove protective equipment worn in the contamination reduction zones according to the procedures presented in Subsection 6.2.

The decontamination pad area will be constructed on top of the landfill near the existing access road and leachate manholes. Personnel decontamination areas will be located at proposed investigation points.

### 6.1.3 Support Zone

The support zone is a noncontaminated or clean area. Support zones will be located outside of the contamination reduction zones. Protective clothing is not required in the support zone. Support equipment, such as clean protective equipment, supplies, sanitary facilities, and drinking water will be located in these zones, which will include a support trailer or field vehicle. The location of the support zone and any support facilities will be determined based on the following factors:

- Accessibility
- Support services—electric power supply, roads, drinking water, etc.
- Wind direction

## 6.2 Decontamination Procedures

Whenever field personnel or equipment leave the exclusion zones, they must follow prescribed decontamination procedures.

### 6.2.1 Field Personnel

Protective outer garments (e.g., coveralls) will be removed and placed in disposable plastic bags at the perimeter of the contamination reduction zone. Level C and D decontamination procedures will be as follows:

- Before exiting the exclusion zone, remove gross soil and trash from boots and gloves using water and a brush.
- Remove outer gloves first, if used. Remove protective coveralls by rolling them inside out from the upper torso to the feet.
- Wash/Rinse impervious safety boots as appropriate before removing them in the contamination reduction zone. After removal, place boots in a plastic bag for next transport to the exclusion zone.
- For Level C work, first remove the respirator, then the spent cartridges or canisters to clean the face piece.
- Remove inner gloves if used.

- Staff will wash and dry their hands before leaving the ~~contamination reduction~~ support zone, and place used paper towels in disposal bags.

The plastic bags containing the protective equipment waste materials will be stored on-site in a covered roll-off container. Any investigation-derived waste materials will be placed in one of the waste reconsolidation areas as shown on RD plan set Sheet No. 4.

Clean outer garments will be kept accessible to field personnel in the support zone. Water, soap, and paper towels will be kept in the support zone for both regular cleanup and emergency use.

### 6.2.2 Sampling In-field Measurement ~~and Drilling Equipment~~

~~Subsections~~ Subsection 4.9 ~~and 4.10~~ of the FSAP address the decontamination procedures for ~~equipment.~~ sampling in-field measurement.

### 6.2.3 Heavy Equipment and Drilling Equipment Decontamination

All equipment entering the contamination zone and directly contacting waste or contaminated materials will follow the decontamination procedures described below prior to leaving the site:

- All equipment decontamination will occur on-site
- Pressure washing will be conducted at the designated decontamination pad area
- Personnel will wear Modified Level D protection while pressure washer cleaning to prevent dermal contact with contaminated liquids
- Any equipment left on-site at the end of the day in a contaminated status will be left on the contaminated portion of the decontamination pad area

## 6.3 Other Site Personnel

"Other site personnel" refers to government employees, nonessential contractor personnel, local community representatives, and any other persons not actively involved in the RD/RA who enter the RA work zones. Other site personnel entering the facility to observe or participate in RA activities must report directly to the HSR upon reaching the source area under investigation.

The exclusion zone is the zone where hazardous substances are likely to be present. During field activities at the site areas, all personnel entering this zone must wear the required protective equipment and be currently trained.

Table 7-1
Criteria for Changing Protection Levels

| CHANGE | APPROVALS REQUIRED | | |
|---|---|---|---|
| | HSR | HSC | CHSM |
| All nonintrusive work will be conducted under Level D protection at a minimum. | ☐ | ☐ | ☐ |
| Intrusive work will be conducted in Level C. When RMT air monitoring indicates <u>total</u> particulate levels below ~~7.5~~ <u>15</u> mg/m³, and ambient PID levels are below 5 units above background, the HSR may downgrade to modified Level D. When instrument readings are greater than background with the organic vapor monitor, colorimetric tubes will be used to check for the specific presence of benzene, vinyl chloride, and phenol. If benzene levels are above 1 ppm, Level C protection will be used. If vinyl chloride levels are above 1 ppm, Level C protection will be used. If phenol levels are above 5 ppm, Level C protection will be used. | ☒ | ☒ | ☐ |
| When air monitoring indicates 10 ppm vinyl chloride or 50 ppm benzene, Level B protection will be used. | ☐ | ☐ | ☒ |
| When flammable gases are present at or above 10% of the LEL or oxygen levels are found at or below 19.5%, the site will be evacuated. | ☒ | ☐ | ☒ |